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ABSTRACT

Outlined are the minimum requirements for a quinmester course intended to strengthen a student's experience in a first algebra course, prior to entry to high school geometry and the second algebra course. After a brief description of overall goals and strategies, further details are presented in eight sections. Each section gives performance objectives, course outline, suggested strategies, and textbook references. The material covered includes rational numbers, integer exponents, polynomials, radicals, quadratic equations and systems of linear equations. Also included are an algebraic puzzle, suggested word problems, a list of vocabulary, a pretest, and a posttest - all with answers provided. (MM)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

DADE COUNTY PUBLIC SCHOOLS

Mathematics: SURVEY OF ALGEBRA 1 5215.25

SE 013 288

DIVISION OF INSTRUCTION • 1971

# QUINMESTER MATHEMATICS

COURSE OF STUDY

FOR

# SURVEY OF ALGEBRA 1

5215.25

(EXPERIMENTAL)

Written by

Mary N. Moore
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for the

DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, Florida 33132
1971-72

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## PREFACE

The following course of study has been designed to set a minimum standard for student performance after exposure to the material described and to specify sources which can be the basis for the planning of daily activities by the teacher. There has been no attempt to prescribe teaching strategies; those strategies listed are merely suggestions which have proved successful at some time for some class.

The course sequence is suggested for a guide; an individual teacher should feel free to rearrange the sequence whenever other alternatives seem more desirable. Since the course content represents a minimum, a teacher should feel free to add to the content specified.

Any comments and/or suggestions which will help to improve the existing curriculum will be appreciated. Please direct your remarks to the Consultant for Mathematics.

All courses of study have been edited by a subcommittee of the 1970-71 Mathematics Advisory Committee.

## CATALOGUE DESCRIPTION

A review of polynomials, factoring, fractions, exponents, radicals, absolute value, linear and quadratic equations.

Designed for the student who has had experience with the material contained in 4 quins of Algebra 1 but needs strengthening.

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## OVERALL GOALS

Survey of Algebra 1 is designed to:

1. Broaden the student's understanding of the basic concepts of Algebra 1.

2. Deepen the student's appreciation of Algebra 1 as the gateway to all higher mathematics.

3. Strengthen the skills necessary for success in Geometry and Algebra 2.

## SUGGESTED STRATEGIES

1. As little time as possible should be spent on the sections I, II, and III, so that there is time for extensive practice with factoring, radicals, and quadratics.

2. A pretest covering sections I and II may be helpful in determining how much review is needed at this level.

3. Verbal problems should be inserted as often as time permits.

## KEY TO STATE ADOPTED REFERENCES

MA - Dolciani, Mary P. and Wooton, William. Modern Algebra - Structure and Method, Book 1. Boston: Houghton Mifflin Company, 1962.

MSM - Dolciani, Mary; Wooton, William; Beckenbach, Edwin; Jurgensen, Ray; and Donnelly, Alfred. Modern School Mathematics: Algebra 1. Boston: Houghton Mifflin Company, 1967.

MEA - Nichols, Eugene D. Modern Elementary Algebra. New York: Holt, Rinehart and Winston, 1965.

P - Payne, Joseph; Zamboni, Floyd; Lankford, Francis. Algebra One. New York: Harcourt, Brace and World, Inc., 1969.

CA - Smith, Rolland; Lankford, Francis; and Payne, Joseph. Contemporary Algebra, Book 1. New York: Harcourt, Brace and World, 1962.

## Performance Objectives

I. Given any rational number x, the student will determine:
   1. The absolute value of x
   2. The additive inverse of x
   3. The multiplicative inverse of x

   Given any pair of rational numbers x and y, the student will find:
   4. The sum, $x + y$
   5. The difference, $x - y$
   6. The product, $xy$
   7. The quotient, $\frac{x}{y}$ where $y \neq 0$
   8. The sum of the absolute values, $|x| + |y|$
   9. The difference of the absolute values, $|x| - |y|$
   10. The absolute value of the sum $|x + y|$
   11. The absolute value of the difference $|x - y|$

## Course Outline

I. Rational Numbers
   A. Signed Numbers
      1. Addition
      2. Subtraction
      3. Multiplication
      4. Division
   B. Inverses
      1. Additive
      2. Multiplicative
   C. Absolute Value
      1. Use of definition
         $$|x| = \begin{cases} x \text{ if } x > 0 \\ -x \text{ of } x < 0 \end{cases}$$
      2. Sum and difference of absolute values
      3. Absolute value of a sum or difference

## Suggested Strategies

I. 1. Flash cards are helpful in developing rapid calculation with signed numbers.
   2. Stress the reading of -x as the "additive inverse of x" to avoid the idea that -x is negative.

## State Adopted References

| | CA | MA | MSM | MEA | P |
|---|---|---|---|---|---|
| I | Ch. 3<br>pp. 74-106 | Ch. 4<br>pp. 111-141 | Ch. 2<br>pp. 60-87<br>Ch. 3<br>pp. 95-115 | Ch. 3<br>pp. 55-68<br>Ch. 4<br>pp. 85-103 | Ch. 2<br>pp. 51-88 |

## Performance Objectives

II. The student will:
1. Find the solution of any given first degree equation in one variable and with rational coefficients.
2. Find the algebraic solution of any first degree inequality in one variable and with rational coefficients.
3. Graph the solution of any first degree inequality in one variable and with rational coefficients.

## Course Outline

II. Open Sentences in One Variable
- A. Equations
  1. Without parentheses
  2. Including parentheses
- B. Inequalities

## Suggested Strategies

II. 1. Flash cards are helpful in developing rapid mental solutions for simple equations of the form $a + b = c$ or $ax = b$.
2. A graph on the real number line provides an excellent visualization of the solutions to inequalities.

## State Adopted References

| | CA | MA | MSM | MEA | P |
|---|---|---|---|---|---|
| II | Ch. 3<br>pp. 106-109 | Ch. 5<br>pp. 157-159 | Ch. 3<br>pp. 116-120 | Ch. 7<br>pp. 174-210 | Ch. 3<br>pp. 101-122 |

## Performance Objectives

III. Given any pair of terms with rational coefficients and integral exponents, the student will:
  1. Express the product in simple form.
  2. Express the quotient in simple form.

  Given any term with a rational coefficient and an integral exponent, the student will:
  3. Find the simple form of the term raised to a specified power.

## Course Outline

III. Integral Exponents
  A. Understanding of notation
    1. Positive exponents
    2. Zero exponent
    3. Negative exponent
  B. Operations with numbers in exponential form
    1. Multiplication
    2. Division
    3. Raising of a power to a power

## State Adopted References

| | CA | MA | MSM | MEA | P |
|---|---|---|---|---|---|
| III | Ch. 4<br>pp. 125-130,<br>136-138,<br>140 | Ch. 6<br>pp.203-206,<br>215-218 | Ch. 7<br>pp.267-271,<br>Ch. 8<br>pp.307-312,<br>324-327 | Ch. 11<br>pp.312-324 | Ch. 6<br>pp.257 270 |

## Performance Objectives

IV. The student will:

1. Express in simple form:
   a. The sum of any pair of rational polynomials of degree ≤ 5.
   b. The difference of any pair of rational polynomials of degree less than 5.
   c. The product of any pair of polynomials of degree less than 5.
2. Find by inspection the product of any pair of binomials where the coefficients are integers with absolute value less than 15.
3. Divide a given polynomial by a given binomial.
4. Factor into a product of primes a given polynomial which:
   a. Has a common monomial factor.
   b. Is the difference of two squares.
   c. Is a trinomial with two integral binomial factors.

## Course Outline

IV. Polynomials

- A. Addition and subtraction
- B. Multiplication
  1. Polynomial by monomial
  2. Polynomial by polynomial
- C. Factoring
  1. Removing greatest common monomial factor
  2. Difference of two squares
  3. Trinomials with integral prime factors
- D. Division by a monomial

## State Adopted References

| | CA | MA | MSM | MEA | P |
|---|---|---|---|---|---|
| IV | Ch. 4<br>pp.122-124,<br>130-131,<br>134-136,<br>138-139,<br>143-144,<br>251-264,<br>271-277 | Ch. 6<br>pp.197-202,<br>206-210,<br>219-221,<br>237-248,<br>253-262 | Ch. 7<br>pp.271-292,<br>311-314 | Ch. 12<br>pp.351-361,<br>384-388 | Ch. 7<br>pp.307-339 |

## Performance Objectives

V. Given a set of rational algebraic expressions, the student will:
   1. Reduce any one to lowest terms.
   2. Multiply any pair.
   3. Perform division by any not equal to zero.
   4. Add any pair.
   5. Find the difference of any pair.
   6. Find the solution of any first degree equation containing these expressions.

## Course Outline

V. Fractions
   A. Reduction to lowest terms
   B. Multiplication
   C. Division
   D. Addition
   E. Subtraction
   F. Solution of equations
   G. Solution of verbal problems

## State Adopted References

| | CA | MA | MSM | MEA | P |
|---|---|---|---|---|---|
| V | Ch. 9 pp.291-319, Ch. 10 pp.324-328 | Ch. 8 pp.281-304, 306-314 | Ch. 8 pp.328-338, Ch. 9 pp.350-353 359-362 | Ch. 6 pp.146-161 (very weak) | Ch. 9 pp.385-408 Ch. 10 pp.421-424 |

## Performance Objectives

VI. Given a set of real numbers where the irrational numbers are expressed in radical form and exponents are limited to whole numbers, the student will:

1. Classify each member as rational or irrational.
2. Express any number in simple form.
3. Find in simple form:
   a. The sum of any pair.
   b. The difference of any pair.
   c. The product of any pair.
   d. The quotient of any pair where the divisor is not zero.
4. Estimate the value of the square root of any whole number (to the nearest whole number).
5. Use a table to find a decimal approximation for the square root of any whole number.

## Course Outline

VI. Radicals
- A. Definitions
  - 1. Rational number
  - 2. Irrational number
- B. Simple form
  - 1. Removing terms from radical
  - 2. Rationalizing denominator
- C. Operations
  - 1. Multiplication
  - 2. Division
  - 3. Addition
  - 4. Subtraction
- D. Decimal approximation of square roots
  - 1. Estimation without table
  - 2. Use of table

## State Adopted References

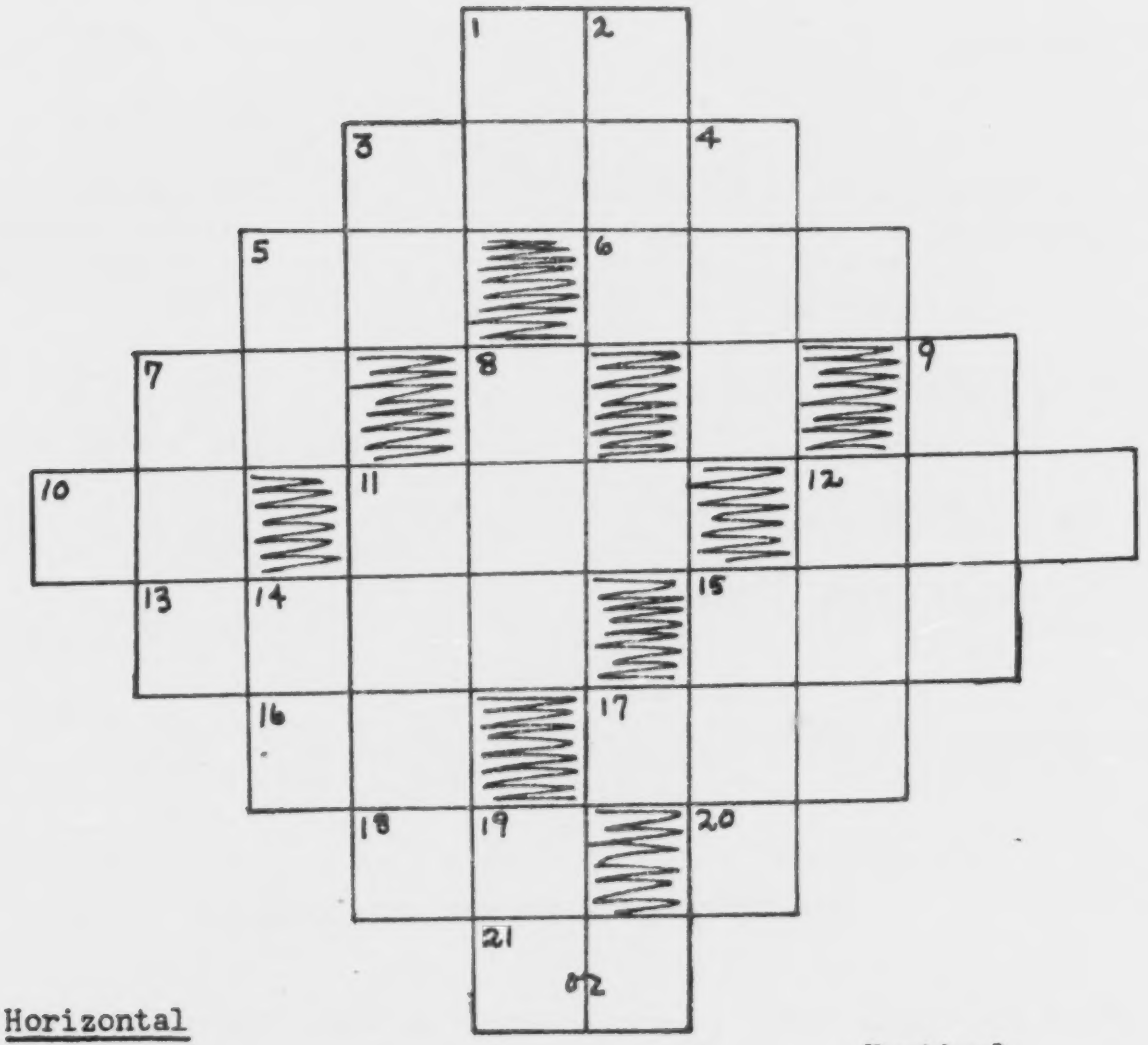
| | CA | MA | MSM | MEA | P |
|---|---|---|---|---|---|
| VI | Ch. 12<br>pp. 384-394<br>403-414 | Ch. 11<br>pp. 403-420 | Ch. 11<br>pp. 419-430<br>437-445 | Ch. 3<br>pp. 68-70<br>Ch. 11<br>pp. 324-331 | Ch. 6<br>pp. 270-273<br>275-288 |

| Performance Objectives | Course Outline |
|---|---|
| VII. Given an equation of the form $ax^2 + bx + c = 0$ where a, b, and c are rational numbers, $a \neq 0$, and x is real the student will find the solution set by:<br>1. Factoring<br>2. Completing the square<br>3. Using the quadratic formula | VII. Quadratic Equations<br>A. Solution by factoring<br>B. Solution by completing the square<br>C. Solution by using the quadratic formula<br>D. Solution of verbal problems |
| VIII. Given a pair of linear equations with rational coefficients, the student will find the common solution by:<br>1. The addition method<br>2. The substitution method | VIII. Simultaneous Linear Equations<br>A. Solution by addition method<br>B. Solution by substitution method |

State Adopted References

| | CA | MA | MSM | MEA | P |
|---|---|---|---|---|---|
| VII | Ch. 8<br>pp. 282-283<br>Ch. 13<br>pp. 430-440 | Ch. 7<br>pp. 264-267<br>Ch. 13<br>pp. 465-475 | Ch. 7<br>pp. 292-296<br>Ch. 11<br>pp. 448-456 | Ch. 12<br>pp. 361-373 | Ch. 8<br>pp. 358-373 |
| VIII | Ch. 7<br>pp. 223-225<br>228-232 | Ch. 10<br>pp. 370-378 | Ch. 6<br>pp. 236-243 | Ch. 10<br>pp. 299-304 | Ch. 5<br>pp. 227-236 |

# ALGEBRAIC PUZZLE



## Horizontal

1. $|-19 + 7|$
3. $(-60)^2 + (-5)^3$
5. $(-8)(-3) - 2$
6. $6 \cdot 10^2 - (-3)$
7. The value of x in:
   $\frac{x}{3} + \frac{x}{4} = 14$
8. The multiplicative identity
10. $9\sqrt{16}$
11. $[(-3)(-4)]^2$

## Vertical

1. $\sqrt{196}$
2. $4^4 + (-4)(-5)$
3. $2^5$
4. The value of x in:
   $x + .06x = 530$
5. The value of x in:
   $8x + 3(6 - x) = 138$
7. $(5\sqrt{10})^2 + 13$
8. The value of x in:
   $\frac{8}{x + 20} = \frac{6}{x - 20}$

Continued on the next page

ALGEBRAIC PUZZLE Continued

Horizontal

12. $6[2 - 4(7 - 11)]$

13. $(-90)(-40)$

15. $8^3$

16. The ordered pair (x,y) which satisfies:
$x + 2y = 14$
$2x - y = 13$

17. $\dfrac{3(-5) - 7(-4)}{\left(\frac{1}{4}\right)^2}$

18. $(10 + 2\sqrt{2})(10 - 2\sqrt{2})$

20. The multiplicative inverse of $\frac{1}{3}$

21. The values of x in:
$x^2 + 15 = 8x$

Vertical

9. $2^4 \cdot 3^3 + (-3)(-2)(-5)$

11. $10^3 + \sqrt{1521}$

12. $(11 + \sqrt{3})(11 - \sqrt{3})$

14. Two consecutive even positive integers the sum of whose squares is 100.

15. $(-50) + (-\frac{1}{10}) + 3(6)^0$

19. $|18| + |-5|$

SUGGESTED WORD PROBLEMS (Optional)

1. Ellen has three times as many records as Sue. Together they have 32 records. How many does each girl have?

2. The sum of 3 numbers is 51. If the third is 20 more than the first, and the second is 3 more than twice the first, find the numbers.

3. A swimming pool is 5 ft. longer than twice its width. Its perimeter is 82 ft. Find its dimensions.

4. A man died, and left an estate of $60,000. The widow was to receive three times as much as the son. The daughter was to receive $5,000 less than the son. How much did each receive?

5. Jim and Bob played a game of marbles. Before the game, Jim had two more than 3 times as many marbles as Bob. After Bob had won 8, they were even. How many did each have originally?

6. Find 4 consecutive odd integers whose sum is 56.

7. Two cars leave New York at the same time, one going north; the other, traveling 25 mph faster, going south. Find their rates if, after 11 hrs., they are 1155 miles apart.

SUGGESTED WORD PROBLEMS Continued

8. A man spent $38 for a watch, pen, and wallet. He paid $2 more for the wallet than the pen, and three times as much for the watch as the wallet. Find the cost of each.

9. Eighteen coins consisting of dimes and quarters amount to $2.25. Find the number of each coin.

10. There are 3 consecutive even integers such that the first increased by twice the third is more than 25. Find the least possible such integers.

11. Eight less than twice a certain number is twelve more than the number. Find the number.

12. Find the length and width of a rectangle if the length is five feet more than the width and the perimeter is 58 feet.

13. A plane left Miami at 8 a.m. traveling at 400 mph. Three hours later a jet left Miami traveling in the same direction at 600 mph. At what time will the jet overtake the plane?

14. Find three consecutive even integers if the product of the first and third is six more than nine times the second.

15. Twice the square of a certain number is 15 more than the number.

16. The volume of a sphere is $\frac{4\pi R^3}{3}$; find the volume if $R = 5$ inches and $\pi = 3.14$.

17. The number of baseball games won is more than four times the number lost. What are the possible number of games lost if the team won 15 games.

18. Steve is three times as old as Gene was last year. If the sum of their ages is 41, how old is each now?

19. Richard traveled by plane from his home to college and returned by car. What was the speed of the car if the plane traveled at 400 mph for a half hour and the return trip by car took 4 hours?

20. The product of six more than a certain number and five less than twice the number is equal to square of the number. Find the number.

## KEY TO WORD PROBLEMS

1. Sue 8 records
   Ellen 24 records

2. 1st number is 7
   2nd number is 17
   3rd number is 27

3. width 12'
   length 29 '

4. Son - $13,000
   Widow - $39,000
   Daughter - $8,000

5. Bob - 7 marbles
   Jim - 23 marbles

6. 11, 13, 15, 17

7. North car - 40 mph
   South car - 65 mph

8. Pen $6
   Wallet $8
   Watch $24

9. 3 quarters, 15 dimes

10. 8, 10, 12

11. 20

12. width 12'
    length 17'

13. 5 pm

14. 8, 10, 12

15. 3

16. 523 cu. in.

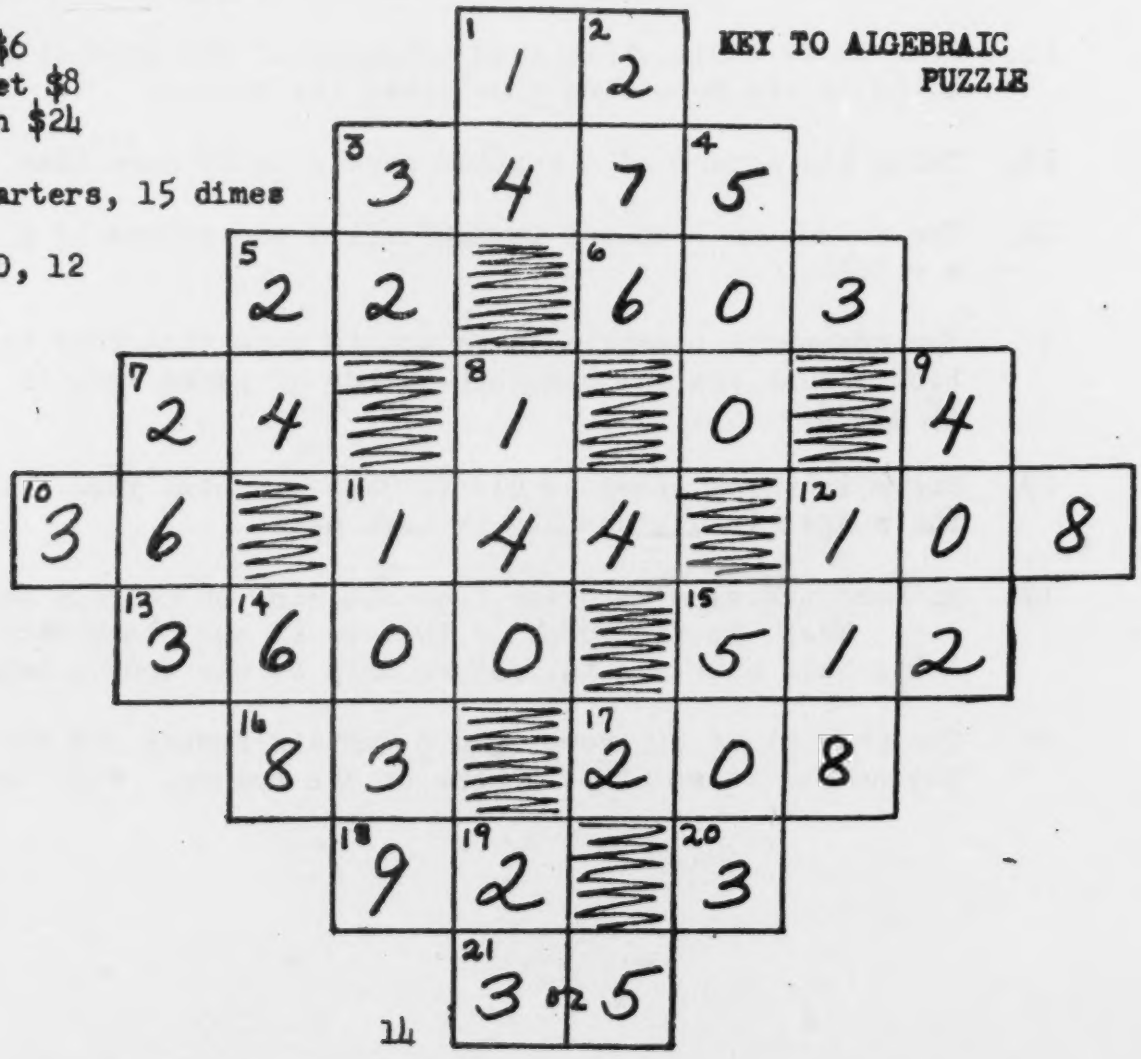
17. 0, 1, 2, 3

18. 11, 30

19. 50 mph

20. -10, 3

## KEY TO ALGEBRAIC PUZZLE




14

## VOCABULARY

The student should be thoroughly familiar with the meaning and use of these terms:

absolute value

addition inverse (opposite)

base

binomial

coefficient

degree

domain

equation

exponent

expression

factor

integer

irrational number

monomial

multiplicative inverse (reciprocal)

null set (empty set)

polynomial

power

prime factor

radical

radicand

rational number

real number

root

term

trinomial

PRETEST

I. Perform the indicated operations and simplify. Select the letter indicating the correct answer and place it in the blank provided.

___ 1. $-(5 + -2) + 7 =$
(a) 0 (b) 4 (c) 10 (d) none of these

___ 2. $8 - z + 3(z + 9) =$
(a) $2z + 17$ (b) $4z + 17$ (c) $4z - 1$ (d) $2z + 35$

___ 3. $2x^4 \cdot 3x^5 =$
(a) $5x^{20}$ (b) $6x^{20}$ (c) $5x^9$ (d) none of these

___ 4. $(2x^2)^3 \cdot 4y^{12} =$
(a) $32x^6y^{12}$ (b) $8x^5y^{12}$ (c) $128x^5y^{12}$ (d) none of these

___ 5. $\frac{18x^2y^{12}z}{2x^4y^3} =$
(a) $\frac{9y^9z}{x^2}$ (b) $\frac{16y^4z}{x^2}$ (c) $16x^2y^9z$ (d) $\frac{-2y^9z}{x^2}$

___ 6. $\frac{x^5 \cdot x^0}{(4x^2)^3} =$
(a) 0 (b) $\frac{1}{64x}$ (c) $\frac{1}{12}$ (d) none of these

___ 7. $(2x + 7)(3x - 5) =$
(a) $5x^2 + 31x - 35$ (b) $6x^2 + 31x - 35$ (c) $6x^2 + 11x - 35$
(d) $5x^2 - 35$

___ 8. $\frac{r^2 - s^2}{m^2 - n^2} \cdot \frac{m + n}{r - s} =$
(a) $\frac{r - s}{m - n}$ (b) $\frac{r - s}{m + n}$ (c) $\frac{r + s}{m + n}$ (d) $\frac{r + s}{m - n}$

___ 9. $\frac{ax - 2a}{bx - 3b} + \frac{cx - 2c}{dx - 3d} =$
(a) $\frac{acx^2 - 4acx + 4ac}{bdx^2 - 6bdx + 9bd}$ (b) $\frac{ad}{bc}$ (c) 0 (d) none of these

___ 10. $\frac{4}{r^2s} + \frac{2 - r}{rs^2} =$
(a) $\frac{2 - r}{rs}$ (b) $\frac{4s + 2r - r^2}{r^2s^2}$ (c) $\frac{4s - r}{r^2s^2}$ (d) none of these

___ 11. $\frac{y}{y^2 - 25} - \frac{1}{2y + 10} =$
(a) $\frac{y - 1}{y^2 - 25}$ (b) $\frac{y + 5}{2y^2 - 50}$ (c) $\frac{1}{2y - 10}$ (d) none of these

____ 12. Which one of the following is an irrational number?
(a) $\sqrt{2}$ (b) $\frac{1}{3}$ (c) $.66\overline{6}$ (d) $\sqrt{4}$

In problems 13 and 14 the variables represent non-negative real numbers.

____ 13. $\sqrt{48x^2y^3}$ =
(a) $xy\sqrt{48y}$ (b) $x\sqrt{48y^3}$ (c) $4xy\sqrt{3y}$ (d) $16xy^2\sqrt{3xy}$

____ 14. $2\sqrt{15x^3y^5} \times 3\sqrt{5xyz}$ =
(a) $6\sqrt{75x^3y^5z}$ (b) $30x^2y^3\sqrt{3z}$ (c) $30xy^2\sqrt{3xyz}$ (d) none of these

____ 15. $\frac{2\sqrt{54}}{\sqrt{6}}$ = (a) 6 (b) $8\sqrt{3}$ (c) 216 (d) none of these

____ 16. $2\sqrt{3} + 5\sqrt{8} - \sqrt{3} + 4\sqrt{\frac{1}{2}}$ =
(a) (b) $\sqrt{3} + 10\sqrt{2} - 4\sqrt{\frac{1}{2}}$ (c) $\sqrt{3} + 12\sqrt{2}$ (d) none of these

II. Factor the following expressions completely; place the correct answer in the blank.

_____ 17. $x^2 - 9$

_____ 18. $16r^2 - 40rt + 25t^2$

_____ 19. $10y^2 - 11y - 6$

_____ 20. $6y^3 + 3y^2 - 3y$

_____ 21. $3x^2 - 12$

_____ 22. $x^2 + 16$

III. Solve each equation; write the solution in the space provided.

_____ 23. $15 - |x| = 4$

_____ 24. $6 + |x| = 2$

_____ 25. $\frac{n+3}{8} - \frac{n-2}{6} = 1$

_____ 26. $\frac{2y}{y+2} - 2 = \frac{y-8}{y-2}$

_____ 27. $9x + 5z = 33$
$6x - 7z = -9$

_____ 28. $7 - 5y = -3y - 11$

PRETEST Continued

_____ 29. $2x^2 - 35 = 9x$

_____ 30. $5x^2 - 17 = 0$

_____ 31. $m^2 + 4m + 1 = 0$

_____ 32. $3x - 7 \geq 2x + 5$

POSTTEST

Note: This test is designed for a class period of 55 minutes. The domain is the set of real numbers.

I. In the blank provided, place the letter of the correct choice:

___ 1. $|-6 + 4|$ =
(a) -2 (b) 2 (c) 10 (d) none of these

___ 2. $|-6| + |4|$ =
(a) -2 (b) 2 (c) 10 (d) none of these

___ 3. The additive inverse of $-\frac{2}{3}$ is:
(a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $-\frac{3}{2}$ (d) none of these

___ 4. The multiplicative inverse of $-\frac{2}{3}$ is:
(a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $-\frac{3}{2}$ (d) none of these

___ 5. $\frac{(6)(-8) + (-6)^2}{(-3)(-4)}$ = (a) 1 (b) -1 (c) -7 (d) none of these

___ 6. $x^4 \cdot x^4$ = (a) $x^{16}$ (b) $x^8$ (c) $2x^4$ (d) none of these

___ 7. The solution set of $|y| = y$ is:
(a) {real numbers} (b) {non-negative real numbers} (c) 0
(d) none of these

___ 8. The solution set of $|m| = -m$ is:
(a) {real numbers} (b) {non-negative real numbers} (c) 0
(d) none of these

___ 9. $(3x^3)^2$ = (a) $6x^6$ (b) $9x^9$ (c) $9x^5$ (d) none of these

___10. The solution set of $4x - 6(x + 3) > 10$ is:
(a) $x < -14$ (b) $x > -14$ (c) $x > 4$ (d) $x < 4$

___11. Which of the following is rational?
(a) $\pi$ (b) $\sqrt{28}$ (c) $\frac{\sqrt{12}}{\sqrt{3}}$ (d) $\frac{12}{\sqrt{3}}$

___12. Which of the following is irrational?
(a) $\sqrt{\frac{4}{9}}$ (b) $3\sqrt{5} \cdot 2\sqrt{5}$ (c) $(7\sqrt{2})^2$ (d) $4\sqrt{2} + 3\sqrt{2}$

___13. Which of the following does not equal $6\sqrt{2}$?
(a) $2\sqrt{18}$ (b) $\sqrt{24}$ (c) $3\sqrt{8}$ (d) $\sqrt{72}$

___14. Which of the following could not be added to $3\sqrt{6}$
(a) $\sqrt{\frac{2}{3}}$ (b) $\frac{5}{\sqrt{6}}$ (c) $\sqrt{96}$ (d) $\sqrt{\frac{5}{6}}$

___ 15. The prime factors of $x^2 - 5x - 6$ are:
(a) $(x - 3)(x - 2)$ (b) $(x - 6)(x + 1)$ (c) $(x + 6)(x - 1)$
(d) none of these

___ 16. The prime factors of $x^4 - y^4$ are:
(a) $(x - y)^4$ (b) $(x^2 + y^2)(x^2 - y^2)$ (c) $(x + y)(x - y)(x + y)(x - y)$
(d) none of these

___ 17. The prime factors of $4x^2 - 14x + 6$ are:
(a) $2(2x^2 - 7x + 3)$ (b) $(4x - 2)(x - 3)$ (c) $2(x - 3)(2x - 1)$
(d) none of these

___ 18. $\frac{x - 5}{6} - \frac{x + 3}{8} =$ (a) $\frac{x - 29}{24}$ (b) $\frac{x - 11}{24}$ (c) 1
(d) none of these

___ 19. Which of the following has a <u>different</u> solution set from the others?
(a) $2x^2 - 18 = 0$ (b) $|x| + 1 = 4$ (c) $x^2 + 9 = 6x$
(d) $\frac{x - 1}{2} = \frac{4}{x + 1}$

II. Simplify:

_____ 20. $(x - 3)(x - 5) - (x + 7)$

_____ 21. $\frac{x^2 - 9}{2x - 6} \times \frac{2x}{x^2 + 7x + 12}$

_____ 22. $\frac{3}{x + 4} + \frac{2}{x - 5}$

_____ 23. $\sqrt{50} - 6\sqrt{\frac{1}{2}}$

III. Give the prime factors of:

_____ 24. $3x^2 - 75$

_____ 25. $x^2 - 13x - 30$

_____ 26. $6x^2 + 7x - 20$

_____ 27. $6x^2 + 24x$

IV. Find the solution set of each of the following open sentences. Show steps in the space provided. If the solution set is irrational, leave in simplest radical form:

28. $6x - 2(x + 6) = 9 + x$

29. $x - 4 - \frac{1}{3}x - 6 > 0$

30. $\frac{12}{x} - \frac{3}{2x} - \frac{1}{4} = -2$

31. $3x - 4y = 38$
$2x - y = 17$

32. $2x^2 + 7x = 4$

33. $3x^2 + 1 = 5x$

KEY TO PRETEST

1. b
2. d
3. d
4. a
5. a
6. b
7. c
8. d
9. b
10. b
11. c
12. a
13. c
14. b
15. a
16. c
17. $(x + 3)(x - 3)$
18. $(4r - 5t)^2$
19. $(5y + 2)(2y - 3)$
20. $3y(2y - 1)(y + 1)$
21. $3(x + 2)(x - 2)$
22. $x^2 + 16$
23. 11, -11
24. $\emptyset$
25. -7
26. 6, -4
27. (2, 3)
28. 9
29. $\frac{-5}{2}$, 7
30. $\frac{\pm\sqrt{85}}{5}$
31. $-2 \pm \sqrt{3}$
32. $x \geq 12$

KEY TO POSTTEST

1. b
2. c
3. a
4. c
5. b
6. b
7. b
8. d
9. d
10. a
11. c
12. d
13. b
14. d
15. b
16. d
17. c
18. a
19. c
20. $x^2 - 9x + 8$
21. $\frac{x}{x + 4}$
22. $\frac{5x - 7}{x^2 - x - 20}$
23. $2\sqrt{2}$
24. $3(x + 5)(x - 5)$
25. $(x - 15)(x + 2)$
26. $(3x - 4)(2x + 5)$
27. $6x(x + 4)$
28. 7
29. $x > 15$
30. -6
31. (6, -5)
32. $-4, \frac{1}{2}$
33. $\frac{5 \pm \sqrt{13}}{6}$